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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/507,112	09/10/2004	Liwen He	36-1842	4135

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EXAMINER

FERNANDEZ RIVAS, OMAR F

ART UNIT	PAPER NUMBER
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2129

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07/30/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/507,112	Applicant(s) HE, LIWEN	
	Examiner Omar F. Fernández Rivas	Art Unit 2129	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 May 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 and 23-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-21 and 23-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 May 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>6/31/2005</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This Office Action is in response to an RCE filed by the Applicant entered on May 14, 2007.
2. The Office Actions of December 12, 2006, and May 17, 2006 are incorporated into this Non-Final Office Action by reference.

Status of Claims

3. No claim has been amended. Claim 22 had been previously cancelled. Claims 24-25 are new. Claims 1-21 and 23-25 are pending on this application.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1, 14, 21, 24 and 25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1, 14, 21, 24 and 25

The claims recite the limitation "the next generation". There is insufficient antecedent basis for this limitation in the claims.

Claim Rejections - 35 USC § 101

5. The applicant's arguments regarding the rejection under 35 USC 101 have been fully considered and are persuasive. The rejection under 35 USC 101 has been withdrawn.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-6, 8-21 and 23-25 are rejected under 35 U.S.C. 102(b) as being anticipated by Corne et al. (PCT #WO 02/03716 A1, referred to as **Corne**).

Claims 1 and 21

Corne anticipates an automated computerized method for optimizing allocation of a set W of n tasks to m available resources for accomplishing such tasks using combinatorial multimodal optimization for finding multiple optimal ways of dividing said set W of n task values into m respectively groups associated with said resources, such that each of the groups satisfies a respective constraint condition (**Corne**: p9, L16-21; p12, L26 to p15, L19; p24, L12 to P25, L11; Figs. 3 and 4; Examiner's Note (EN): data traffic processed by the nodes in a network are tasks. The nodes in the network are resources. The methods used to find the optimal solution are combinatorial multimodal

optimization techniques as understood from paragraph 3 of the present application), the method including execution of a computer program to automatically perform a series of machine operations comprising: (a) receiving digital data signals representing plural tasks for assignment to available resources and, based thereon, defining an initial population of trial solutions assigning specific tasks to specific resources (**Corne**: P16, L1-4; p27, L3-10; Fig. 3); (b) calculating for each trial solution a fitness vector indicative of whether the constraint condition for each group has been satisfied (**Corne**: p3, L30 to p4, L13; p16, L5-23; P28, L14-19; EN: paragraph 11 applies. First and second solutions are groups); (c) selecting a plurality of trial solutions for the next generation in dependence upon their respective fitness vectors (**Corne**: p3, L30 to p4, L13; p16, L5-23; p27, L3-24; Figs. 3-5); (d) creating a new population of trial solutions including the selected earlier trial solutions (**Corne**: P16, L1-26; p28, L21-22; Figs. 3-5); (e) repeating steps (b) to (d) until the population of trial solutions stabilizes, the individual trial solutions of the stable population representing multiple optional ways of dividing the set W of tasks (**Corne**: p16, L1-32; p27, L3-25; Figs. 3-5; EN: the optimum configuration parameters are optional ways of dividing the tasks); and (f) outputting at least one of said stabilized population as an optimized allocation of tasks to resources (**Corne**: p27, L26).

Claim 2

Corne anticipates the fitness vector is of length m , each element in the fitness vector being indicative of whether the constraint condition of a corresponding one of the m groups has been satisfied (**Corne**: p2, L4-6; p3, L30 to p4, L13; p9, L23-30; p16, L5-

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22; p28, L4-19; EN: paragraph 11 applies. Analyzing the solutions for dominance will determine which solution best satisfies a constraint condition (cost)).

Claim 3

Corne anticipates the fitness vector comprises m bits, each bit being indicative of whether the constraint condition of a corresponding one of the m groups has been satisfied (**Corne:** p2, L4-6; p3, L30 to p4, L13; p16, L5-22; P28, L4-19; EN: a computer system operates on bits).

Claim 4

Corne anticipates calculating a fitness value for each individual trial solution (**Corne:** p8, L32 to p9, L6; p24; p28, L4-19; EN: calculating the cost value).

Claim 5

Corne anticipates calculating a fitness value for each individual trial solution in which the fitness value comprises the sum of the bits in the fitness vector (**Corne:** p8, L32 to p9, L6; p24; p28, L4-19; EN: calculating the cost value based on the solution components (the bits in the fitness vector)).

Claim 6

Corne anticipates reserving a proportion of the new population for individual trial solutions selected at step (c) (**Corne:** p8, L32 to p9, L12; p16, L1 to p17, L4; p27, L10-26; p28, L14-22; Fig. 3; EN: paragraph 11 applies. Selecting a group of first solutions based on the cost).

Claim 8

Corne anticipates step (c) comprises selecting non-dominated individual trial solutions using the criteria of Pareto optimality (**Corne**: p3, L29 to p4, L15; p14, L20-27; p18, L29-33).

Claim 9

Corne anticipates selecting non-dominated individual trial solutions using the criteria of Pareto optimality including ranking non-dominated individual trial solutions by fitness value, and selecting from the ranked list (**Corne**: p3, L29 to p4, L15; p14, L20-27; p18, L29-33).

Claim 10

Corne anticipates only non-dominated individual trial solutions with greatest fitness value may be selected at step (c) (**Corne**: p8, L33 to p9, L8; p16, L1 to p17, L4; p28, L4-19; EN: paragraph 11 applies. Identifying the solutions having the cost value closer to the target).

Claim 11

Corne anticipates step (c) comprises selecting individual trial solutions in dependence upon both their respective fitness vectors and their respective fitness values (**Corne**: p8, L33 to p9, L30; p16, L1 to p17, L4; p28, L4-19; EN: paragraph 11 applies. Identifying the solutions having the cost value closer to the target. The cost value is determined by the solution components (the fitness vector)).

Claim 12

Corne anticipates crossover and mutation are applied at step (d) to at least some individual trial solutions in the new population (**Corne**: p22, L21-30; p29, L5-7).

Claim 13

Corne anticipates step (c) comprises selecting no more than one individual trial solution for each unique fitness vector (**Corne**: p8, L33 to p9, L30; p16, L1 to p17, L4; p28, L4-19; EN: paragraph 11 applies. Each solution will have its own fitness vector).

Claims 14 and 23

Corne anticipates an automated computerized method of distributing a plurality of tasks between a plurality of devices connected together to form a network, wherein each device has an associated constraint on the amount of tasks that it can perform per unit of time (**Corne**: p9, L16-21; p12, L26 to p15, L19; p24, L12 to P25, L11; Figs. 3 and 4), the method including execution of a computer program to automatically perform a series of machine operations comprising: (a) generating a plurality of trial solution allocations of tasks to devices to form an initial population of allocations (**Corne**: p8, L26-33; p15, L12 to p16, 4; p27, L3-14; p27, L3-10; p29, L16-19; Fig. 3); (b) calculating for each allocation of tasks to devices a fitness vector indicative of whether the constraint condition for each device has been satisfied (**Corne**: p3, L30 to p4, L13; p16, L5-23; P28, L14-19); (c) selecting a plurality of allocations of tasks to devices for inclusion in the next generation of allocations in dependence upon their respective

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fitness vectors (**Corne**: p3, L30 to p4, L13; p16, L5-23; p27, L3-24; Figs. 3-5); (d) creating the next generation of allocations of tasks to devices by including the allocations selected in step (c) together with new allocations, each of which is formed from a combination of two or more of the allocations selected in step (c) (**Corne**: P16, L1-26; p28, L21-22; Figs. 3-5); (e) repeating steps (b) to (d) until the population stabilizes (**Corne**: p16, L1-32; p27, L3-25; Figs. 3-5); and (f) outputting an allocation of the tasks among the devices according to one of the allocations included in the stabilized population (**Corne**: p27, L26).

Claim 15

Corne anticipates the devices are processors within a multi-processor computer system (**Corne**: p24, L12 to p25, L30; EN: paragraph 11 applies. The method could be parallelized (multiprocessors). Moreover, the clients and servers contain processors (a multiprocessor computer system).

Claim 16

Corne anticipates the devices are computers within a computer network (**Corne**: p24, L12 to p25, L3; EN: the clients and the servers in the network).

Claim 17

Corne anticipates the devices are routers and the tasks are estimated volumes of traffic to be routed through the routers within a data network, and wherein the allocations are used to form a routing strategy (**Corne**: p16-21; p27, L31 to p28, L2).

Claim 18

Corne anticipates step (c) comprises selecting non-dominated allocations using the criteria of Pareto optimality of the associated fitness vectors (**Corne**: p3, L29 to p4, L15; p14, L20-27; p18, L29-33).

Claim 19

Corne anticipates new allocations are formed in step (d) by performing crossover operations in respect of groups of two or more of the allocations selected in step (c) (**Corne**: p22, L21-30; p29, L5-7).

Claim 20

Corne anticipates mutation operations are applied to one or more of the new allocations formed in step (d) according to a predetermined probability of each new allocation being mutated (**Corne**: p17, L9-24; p22, L21-30; p25, L10-14; p29, L5-7).

Claim 24

Corne anticipates a method of operating a multi-processor computer system to execute a computer program including a set of multiple separate tasks which must all be completed in order for the program execution to be complete (**Corne**: p2, L4-6; p25, L16-21), said method comprising: distributing multiple of said set of program tasks between multiple computer program processor devices to efficiently accomplish all such distributed tasks (**Corne**: p24, L25 to p25, L30), said distribution of tasks to said processor devices being accomplished by: (a) receiving digital data signals representing a set of plural tasks for assignment to available processor devices and, based thereon, defining an initial population of trial solutions assigning specific tasks to specific

processor devices (**Corne**: p8, L26-33; p15, L12 to p16, 4; p27, L3-14; p27, L3-10; p29, L16-19; Fig. 3); (b) calculating for each trial solution a fitness vector indicative of whether the constraint condition for each processor device has been satisfied (**Corne**: p3, L30 to p4, L13; p16, L5-23; P28, L14-19); (c) selecting a plurality of trial solutions for the next generation in dependence upon their respective fitness vectors (**Corne**: p3, L30 to p4, L13; p16, L5-23; p27, L3-24; Figs. 3-5); (d) creating a new population of trial solutions including the selected earlier trial solutions (**Corne**: P16, L1-26; p28, L21-22; Figs. 3-5); (e) repeating steps (b) to (d) until the population of trial solutions stabilizes, the individual trial solutions of the stable population representing multiple optional ways of dividing the input set of tasks (**Corne**: p16, L1-32; p27, L3-25; Figs. 3-5); and (f) outputting task assignments to said processor devices in conformance with at least one of said stabilized population as an optimized allocation of tasks to resources (**Corne**: p27, L26).

Claim 25

Corne anticipates a multi-processor computer system for executing a computer program including a set of multiple separate tasks which must all be completed in order for the program execution to be complete (**Corne**: p2, L4-6; p25, L16-21), said system comprising: a plurality of computer program processors (**Corne**: p24, L25 to p25, L30; EN: paragraph 11 applies. The method can be parallelized (multiple processors). Moreover, a client/server system and a network will have multiple processors working together); and means networked with said multiple computer program processors for distributing multiple of said set of program tasks between said multiple computer

program processor devices to efficiently accomplish all such distributed tasks (**Corne:** p24, L25 to p25, L30; paragraph 11 applies. The communication channels used by the system), said distribution of tasks to said processor devices being accomplished by:

(a) receiving digital data signals representing a set of plural tasks for assignment to available processors and, based thereon, defining an initial population trial solutions assigning specific tasks to specific processors (**Corne:** p8, L26-33; p15, L12 to p16, 4; p27, L3-14; p27, L3-10; p29, L16-19; Fig. 3); (b) calculating for each trial solution a fitness vector indicative of whether the constraint condition for each processor has been satisfied (**Corne:** p3, L30 to p4, L13; p16, L5-23; P28, L14-19); (c) selecting a plurality of trial solutions for the next generation in dependence upon their respective fitness vectors (**Corne:** p3, L30 to p4, L13; p16, L5-23; p27, L3-24; Figs. 3-5); (d) creating a new population of trial solutions including the selected earlier trial solutions (**Corne:** P16, L1-26; p28, L21-22; Figs. 3-5); (e) repeating steps (b) to (d) until the population of trial solutions stabilizes, the individual trial solutions of the stable population representing multiple optional ways of dividing the input set of tasks (**Corne:** p16, L1-32; p27, L3-25; Figs. 3-5), and (f) outputting task assignments to said processors in conformance with at least one of said stabilized population as an optimized allocation of tasks to resources (**Corne:** p27, L26).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Corne as set forth above in view of Buckzak et al (US Paten #6,957,200, referred to as **Buczak**).

Claim 7

Corne does not teach a non-reserved proportion of the new population is generated using a Roulette wheel selection method.

Buczak teaches a non-reserved proportion of the new population is generated using a Roulette wheel selection method (**Buczak**: C6, L33-41; C8, L56 to C9, L7; C18, claim 12).

It would have been obvious to one of ordinary skill in the arts at the time of the applicant's invention to modify the teachings of Corne by incorporating generating a non-reserved proportion of the new population using the roulette wheel method as taught by Buczak for the purpose of having a process that selects individuals from the population for mating based on the fitness of the genes in the population.

Examination Considerations

8. The claims and only the claims form the metes and bounds of the invention." "Office personnel are to give the claims their broadest reasonable interpretation in light of the supporting disclosure. In re Morris, 127 F.3d 1048, 105455, 44USPQ2d 1023, 1027-28 (Fed. Cir. 1997). Limitations appearing in the specification but not recited in the claim are not read into the claim. In re Prater, 415 F.2d, 1393, 1404-05, 162 USPQ'541,

550-551 (CCPA 1969)" (MPEP p 2100-8, c 2, I 45-48; p 2100-9, c 1, I 1-4). The Examiner has full latitude to interpret each claim in the broadest reasonable sense. Examiner will reference prior art using terminology familiar to one of ordinary skill in the art. Such an approach is broad in concept and can be either explicit or implicit in meaning.

9. Examiner's Notes are provided with the cited references to prior art to assist the applicant to better understand the nature of the prior art, application of such prior art and, as appropriate, to further indicate other prior art that maybe applied in other office actions. Such comments are entirely consistent with the intent and spirit of compact prosecution. However, and unless otherwise stated, the Examiner's Notes are not prior art but a link to prior art that one of ordinary skill in the art would find inherently appropriate.

10. Unless otherwise annotated, Examiner's statements are to be interpreted in reference to that of one of ordinary skill in the art. Statements made in reference to the condition of the disclosure constitute, on the face of it, the basis and such would be obvious to one of ordinary skill in the art, establishing thereby an inherent prima facie statement.

11. Examiner's Opinion: paragraphs 9-10 apply. The claims and only the claims form the metes and bounds of the invention. The Examiner has full latitude to interpret each claim in the broadest reasonable sense.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Gounares et al US Patent #6,088,690

Koza US Patent #5,136,686

13. Claims 1-21 and 23-25 are rejected.

Correspondence Information

14. Any inquires concerning this communication or earlier communications from the examiner should be directed to Omar F. Fernández Rivas, who may be reached Monday through Friday, between 8:00 a.m. and 5:00 p.m. EST. or via telephone at (571) 272-2589 or email omar.fernandezrivas@uspto.gov.

If you need to send an Official facsimile transmission, please send it to (571) 273-8300.

If attempts to reach the examiner are unsuccessful the Examiner's Supervisor, David Vincent, may be reached at (571) 272-3080.

Hand-delivered responses should be delivered to the Receptionist @ (Customer Service Window Randolph Building 401 Dulany Street Alexandria, VA 22313), located on the first floor of the south side of the Randolph Building.

Omar F. Fernández Rivas
Patent Examiner
Artificial Intelligence Art Unit 2129
United States Department of Commerce
Patent & Trademark Office

Thursday, July 19, 2007

EFR

7/19/07
DAVID VINCENT
SUPERVISORY PATENT EXAMINER